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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/632,247	08/01/2003	Desmond R. Lim	MIT8935ADIV	3305

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EXAMINER

ALLEN, DENISE S

ART UNIT	PAPER NUMBER
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2872

DATE MAILED: 09/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/632,247	Applicant(s) LIM ET AL.	
	Examiner Denise S Allen	Art Unit 2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 June 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-25 is/are pending in the application.
- 4a) Of the above claim(s) 13-25 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 August 2003 and 10 June 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

The replacement drawings were received on June 10, 2004 and are acceptable to the examiner.

In light of the replacement drawings, the objection to the drawings in the Office Action on March 29, 2004 has been withdrawn.

Response to Arguments

In the Applicant's response on June 10, 2004, the Applicant argues with respect to claim 1, that Little et al (US 6,411,752) fails to teach or reasonably suggest physically altering the core by deposition or growth as recited in amended claim 1 (page 9). This argument has been fully considered and not found to be persuasive. The Examiner respectfully disagrees with the Applicant's argument. Little et al teaches a method of correcting the resonance position for a micro resonator (column 9 lines 24 – 26) that includes the step of depositing material on the core of the micro resonator (column 9 lines 33 – 34 and Figure 16). Since the micro resonator (reference 1602) is air-clad, the material (reference 1604) is deposited directly on the core of the micro resonator. The deposited material will inherently alter the effective index of refraction of the micro resonator, which will inherently change the resonance position of the micro resonator.

The Applicant further argues with respect to claim 1, that Kawachi et al (US 4,900,112) fails to teach or reasonably suggest physically altering the micro resonator by deposition or growth of material on the core of the micro resonator as recited in amended claim 1 (pages 9 –

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10). This argument has been fully considered and found to be persuasive. The Examiner agrees that Kawachi et al teaches growth of material on the cladding and not on the core.

The rejection of claims 1, 3, 6, 7, and 11 under 35 U.S.C. 102(b) as being anticipated by Kawachi et al in the Office Action on March 29, 2004 has been withdrawn.

The Applicant further argues with respect to claim 1, that Deacon (US 6,324,204) fails to teach or reasonably suggest a micro resonator as recited in amended claim 1 (pages 10 – 11). This argument has been fully considered and not found to be persuasive. The Examiner respectfully disagrees with the Applicant's argument. Figure 13 of Deacon clearly shows a micro resonator (reference 1324).

The Applicant further argues with respect to claim 1, that Deacon fails to teach or reasonably suggest physically altering the micro resonator by deposition or growth of material on the core of the micro resonator as recited in amended claim 1 (pages 10 – 11). This argument has been fully considered and found to be persuasive. The Examiner agrees that Deacon teaches deposition of material on the cladding and not on the core.

The rejection of claims 1, 3 – 5, 8, and 12 under 35 U.S.C. 102(e) as being anticipated by Deacon in the Office Action on March 29, 2004 has been withdrawn.

The Applicant further argues with respect to claim 1, that Chu et al (IEEE Photonics Technology Letters) fails to teach or reasonably suggest physically altering the micro resonator by deposition or growth of material on the core of the micro resonator as recited in amended claim 1 (pages 11 – 12). This argument has been fully considered and not found to be persuasive. The Examiner respectfully disagrees with the Applicant's argument. Chu et al teaches a method of correcting the resonance position for a micro resonator (page 689 left column lines 6 – 16)

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that includes the step of depositing (by dip coating) material (the photosensitive polymer) on the core of the micro resonator. Since the micro resonator (Figure 1 “ring”) is air-clad ($n_0 = 1$), the material is deposited directly on the core of the micro resonator. The deposited material will inherently alter the effective index of refraction of the micro resonator, which will inherently change the resonance position of the micro resonator.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 3, 4, 8, and 11 are rejected under 35 U.S.C. 102(e) as being anticipated by Little et al.

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention “by another,” or by an appropriate showing under 37 CFR 1.131.

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Regarding claim 1, Little et al teach a method of correcting resonance position or the external decay time of a waveguide micro-resonator comprising physically altering by deposition or growth of material on the core of the waveguide micro-resonator (column 9 lines 24 – 26 and 33 – 34 describes deposition of material on the core of the micro-resonator; see also Figure 16 and Response to Arguments above).

Regarding claim 3, Little et al teach the altering of the material further occurs in the cladding of the waveguide micro-resonator (since the micro-resonator of Little et al is air-clad, the material deposited on the core is inherently in the cladding of the micro-resonator).

Regarding claim 4, Little et al teaches the reaction products of a deposition or growth have different chemical compositions from that of the core (column 5 lines 54 – 65 and column 9 lines 34 – 44).

Regarding claim 8, Little et al teaches the reaction products (reference 1604) of a growth are left between the core (reference 1602) and the cladding (air) after the reaction associated with the growth (column 9 lines 23 – 26).

Regarding claim 11, the altering inherently results in a change in the optical path length of the waveguide micro-resonator, because the altering changes the effective index of refraction of the micro-resonator and the optical path length is a function of the effective index of refraction.

Claims 1, 3 – 5, and 8 – 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Chu et al.

Regarding claim 1, Chu et al teach a method of correcting resonance position or the external decay time of a waveguide micro-resonator comprising physically altering by deposition

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or growth of material on the core of the waveguide micro-resonator (page 689 left column lines 6 – 16 describes deposition of material on the core of the micro-resonator; see also Figure 1 and Response to Arguments above).

Regarding claim 3, Chu et al teach the altering of the material further occurs in the cladding of the waveguide micro-resonator (since the micro-resonator of Chu et al is air-clad, the material deposited on the core is inherently in the cladding of the micro-resonator).

Regarding claim 4, Chu et al teaches the reaction products of a deposition or growth have different chemical compositions from that of the core (page 688 right column lines 14 – 15 and page 689 left column lines 9 – 11).

Regarding claim 5, Chu et al teaches the altering comprises a wet chemical reaction (page 689 left column line 8).

Regarding claim 8, Chu et al teaches the reaction products (“photosensitive polymer”) of a growth are left between the core and the cladding after the reaction associated with the growth (page 689 left column lines 6 – 16).

Regarding claim 9, Chu et al teach the reaction products of a deposition or growth have refractive indices (page 689 left column lines 9 – 13 indicate the reaction products have refractive indices between 1.4314 and 1.4754) that range from that of the core (Figure 1 caption indicates the core has a refractive index of 1.7825) to that of the cladding (Figure 1 caption indicates the cladding has a refractive indices of 1.45 and 1.0).

Regarding claim 10, the reaction products of a deposition inherently have a graded refractive index profile from that of the core to that of the cladding (the graded refractive index profile is a function of the intensity of the exposure).

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Regarding claim 11, the altering inherently results in a change in the optical path length of the waveguide micro-resonator, because the altering changes the effective index of refraction of the micro-resonator and the optical path length is a function of the effective index of refraction.

Regarding claim 12, Chu et al teaches the altering results in a change in coupling of said waveguide micro-resonator, thus in a change in coupling efficiency and shape of the waveguide micro-resonator resonance (Figure 4).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chu et al.

Chu et al teaches a method of correcting resonance position of a waveguide micro-resonator as described above. Chu et al does not teach the altering comprises a thermal reaction at temperatures above 100°C.

It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the process of dip coating of Chu et al with the process of sputtering (which is inherently at temperatures above 100°C) to deposit the material on the micro-resonator of Chu et al in order to provide a more uniform layer of material deposited on the core of the micro-resonator.

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Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chu et al in view of Kawachi et al.

Chu et al teaches a method of correcting resonance position of a waveguide micro-resonator as described above. Chu et al does not teach the reaction products of a growth are removed after the reaction associated with the growth.

Kawachi et al teaches a method of correcting resonance position (column 13 line 51 – column 14 line 35) of a waveguide micro-resonator (Figure 7 reference 71) comprising physically altering by deposition or growth of material (column 13 line 51 – column 14 line 35 describes growth of material (reference 31) by laser exposure around the waveguide to correct the resonance position (wavelength), the growth is inherent in the conversion of the amorphous silicon film to a polycrystalline silicon film as described in column 10 lines 27 – 36) on the cladding of a waveguide micro-resonator wherein the reaction products of the growth are removed after the reaction associated with the growth (column 14 lines 1 – 2 and column 10 lines 58 - 65 describes the removal of the products of the growth). It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the step of depositing a UV sensitive material and trimming by exposure to UV light of Chu et al with the step of depositing the stress applying film and trimming by growing and removing the film with a laser of Kawachi et al in order to eliminate and polarization dependence of the micro-resonator (Kawachi et al column 14 lines 7 – 16 and Figures 8A and 8B).

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Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Denise S Allen whose telephone number is (571) 272-2305. The examiner can normally be reached on Monday - Friday, 9:00am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew A Dunn can be reached on (571) 272-2312. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Denise S Allen
Examiner
Art Unit 2872



dsa



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